

ISSUES OF IT-PROFESSIONALS TRAINING IN TRADITIONAL EDUCATIONAL PROCESS

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ABSTRACT

The paper presents issues of modern IT-specialists training. Formation of information- educational environment of IT-professionals is discussed. Studying of enterprise infocommunication infrastructure and its management features within a framework of the traditional educational process is considered.

KEYWORDS

Educational process, IT-professionals, electronic information-educational environment, flexible learning, enterprise network infrastructure

1. INTRODUCTION

Organization of educational process of modern IT-specialists requires modern methods and forms of teaching and learning that correspond to a rapid pace of information technologies development. Training of such specialists has following features (Eminov, 2009):

- Enterprises require qualified graduates who have to be prepared to start on their jobs right after graduation.
- Field of information technologies is changing rapidly, new technologies are developing continually.
- Forms and methods of training adjust to a rapidly changing informational educational environment.

Training of labor market-viable specialists requires arranging educational process taking into account features stated above.

To ensure proper quality of modern professional training, teachers have to be constantly updated on educational content. In order to do this, they use various approaches, such as re-processing and periodic re-issue of study books and manuals, development of electronic educational resources based on specialized systems and web-resources, use of a professional software products, including those available on the Internet, development of their own software-environments for teaching, including these based on mobile technologies.

Our experience of e-learning courses implementation shows, that they allow to create a virtual learning environment, to expand and change the content of disciplines in terms of educational standards, to organize individual, group and collective forms of learning activities, to organize self-directed learning for students to reach educational goals (Golitsyna, 2013). At the same time, forms and methods of teaching have to correspond to educational content of disciplines.

This paper presents approaches to formation of information- educational environment of modern IT-specialists, as well as to organization of traditional educational process through the studying of enterprise infocommunication infrastructure and its management features.

In organization of educational process we were directed by demands of Federal State Educational Standards of higher education in the field of training 09.03.01 Informatics and computer technology, 09.03.02 Information systems and technologies, 09.03.03 Applied Informatics.

2. EDUCATIONAL PROCESS IN INFORMATION-EDUCATIONAL ENVIRONMENT

Electronic information-educational environment of an educational institution provides interaction between participants of educational process, including synchronous and (or) asynchronous communication via Internet. Formation of information-educational environment of organization brings changes to teachers' activity in a way that elements of distance learning are increasingly used in traditional educational process (Solovov, Men'shikova, 2015). These processes lead to the fact that traditional learning process acquires features of "flexible learning". Flexibility is considered as an attribute of both learners and teachers; it can also be understood as a characteristic of institutional educational strategies (Wanner, Palmer, 2015). Researchers emphasize that under "flexible training" conditions teacher has to take a role of a guide and encourage students to be independent and flexible within an educational framework (Agudelo, Salinas, 2015). Flexible learning technologies can be used productively also in a traditional educational process of IT-professionals (Golitsyna, 2017b).

On practical classes of our course "Infocommunication systems and networks" for bachelor program 09.03.02 Information systems and technologies and at the course "Operations research and optimization methods" for bachelor program 09.03.03 Applied Informatics were used following forms of educational activity (Golitsyna, 2017a):

1. Using educational resources of the Internet have been prepared guidelines, giving brief theoretical information on topic and hands-on assignments and tasks for solving problems for each practice session.
2. Students were free to choose software environment or online resources for problem solving. Students had to choose tools for problem solving themselves, including mobile tools.
3. Control in a classroom was in a form of personal discussion with students about practical lessons topics.

This form of training and teaching of classes allowed:

1. To choose and use the most qualitative and methodically prepared educational resources for studying each topic of a taught discipline.
2. To arrange an individual conversation with every student, before which students have to be prepared and answer all the questions on a topic of a lesson. Under preparation for a verbal response, student should actualize task formulation, method of its solution, justify a choice of means of problem solving or task accomplishment method. This form of control, in our opinion, is especially relevant under the modern educational process conditions, when verbal forms are often replaced by computer interaction such as tests, reports, learning activity with LMS etc.
3. Let students choose freely methods and means of problem solving and managing of practical tasks. As a result students' independent practical work was personified. Students could independently chose tools for assigned problem solving, including use of mobile devices. Students worked on their tasks at an individual pace, including their time outside a classroom as part of independent work.

Organization of flexible learning of IT-specialties students is especially efficient due to the fact that students actively begin to use professional environment to work on assigned problems. Within a framework of the traditional educational process, students get an opportunity to master methods of self-education and continuous education in electronic educational environment which necessary for successful professional activity of IT-professionals.

Virtual learning environment creates the platform to provide permanent access to educational resources from mobile devices. This option helps students to use opportunities of mobile learning in the educational process.

Web-services are the main tools for self-education for students of IT-specialties. Application of web-resources in a process of self-education leads to formation of informational personal-oriented educational environment for every student. Students widely use web-resources for self-education and academic problems solving (Golitsyna, 2015): they learn distantly using open educational resources. Students use specialized forums for studying of programming languages, as well as for programming from mobile devices, programming online in integrated programming environments IDE. Often they start to program in a framework of self-education.

Thus, flexible learning technology promotes of educational process personalization, which is one of the global trends in development of modern higher education (Burnashov, 2017).

3. EDUCATIONAL PROCESS THROUGH ENTERPRISE INFOCOMMUNICATION INFRASTRUCTURE

Information technologies at enterprises required to provide users with information system services, whose work is supported by enterprise infocommunication infrastructure.

Under teaching of IT-professionals, management of an information network infrastructure has to be taken into account. Information technologies systems are getting more complicated and require creation of information technology service management systems.

Problems of IT- resources management and IT-services effectiveness improvement (ITSM - Information Technology Service Management) were formulated in the 1980s. This methodology has been highly demanded since the beginning of this century, with the transition from the traditional model - support of enterprises' informational and communicational infrastructure, to the model oriented on servicing core business of an enterprise. On enterprises were formed departments (IT-departments), providing functional departments with various services related to information technologies. Additionally to operational services provided to functional departments of an enterprise to ensure proper functioning of its IT-systems, IT-departments have work to improve their own efficiency level.

Nowadays, enterprises require use of information technologies in such areas as: maintaining of electronic correspondence flow, use of the Internet, automating of inner business-processes, supporting interactions with partners etc. Modern IT-departments have service-oriented structure, which is built as a system of processes managing services (Eminov, 2015). IT-departments support and develop infrastructure according to requested services and specified quality. Functional department sets its requirements for a specified type of required services and their quality. In this connection, IT-department of an enterprise becomes an important resource for enterprise management system.

Every type of enterprise infrastructure defines an educational content of IT-students. For example, when students study disciplines corresponding to network infrastructure of information systems, first they need to study basic knowledge, which, in our opinion, can contain following topics:

1. Definition of distributed processing. Possible structures of distributed information processing systems.
2. Basic concepts and definitions of information (computing) networks, such as: network architecture, network protocols and interfaces, concept of "open systems", international standards for network interactions implementation, OSI / ISO model, "client-server" technology etc.
3. Basic modern network technologies of local and corporate networks for office use, based on cable and wireless connections, namely: standards for these technologies, possible data communication environments, access methods to data communication environments, methods of signals and data coding, interface with data communication environments.
4. Basic information about network interactions and network services, particularly: networks interaction organization, network interfaces and protocols, network services, addressing in networks etc.

Hierarchical structure of corporate management system of manufacturing enterprise has to be taken into account while building a training system (Eminov, 2015), which has production character of activity.

Every level designed to perform specific management functions. Each hierarchical management level has its own computing environment, which is a network generally. Information networks with their functioning characteristics are formed on every management level. We will review studying features of office networks, corresponding to upper and middle levels of corporate management system hierarchy.

Possible form of educational activity is a training based on specially organized training ground. Particularly, such training ground was organized for students of bachelor program 09.03.02 Information systems and technologies and bachelor program 09.03.01 Informatics and computer technology in following disciplines: "Infocommunication systems and networks", "Network technologies" and "Corporate information systems".

Students perform necessary operations to create local network infrastructure, using provided to them computers. Modern infocommunication infrastructure of an enterprise is integrated and formed by a combination of cable and wireless components (Eminov, 2017). Students consistently create separate fragments of local network, installing cable systems, computers and communication equipment, making necessary adjustments and tests of single elements of infocommunication system and networks.

After mastering basics of installation, adjustment and testing of infocommunication infrastructure, students move on to learning of administration basics. For solution of this problem they use virtual

environments. Each student creates on PC a virtual environment which usually includes a server that has a special role in learning environment and one (or more if necessary) network workstation. Student learns in created virtual environment and getting necessary skills in setting up various network services required for a normal functioning of enterprise information systems.

After mastering deployment skills of basic network services of enterprise, students begin to administrate more complex services in terms of their formation and configuration parameters. During operations implementation of network and information systems administration, students master skills of creating terminal access, organizing secure data transmission tunnels, creating directory services and solving other tasks of managing enterprise infrastructure.

4. CONCLUSION

Information-educational environment of modern IT-professionals is developing according of development of education and the professional environment. These changes require organization of special learning approaches. These approaches are dictated, on one hand, by industry and business requirements to IT-professionals, on the other hand, by rapid development of professional environment of IT-specialists.

Application of web-resources and mobile devices facilitates infiltration of flexible learning technologies into traditional learning process, which creates additional opportunities for organizing independent work of students and provides personalization of training.

As shows our experience, teachers need:

- to participate in continuous development of the information-educational environment of educational institutions according modern educational standards;
- to work on constant update of educational disciplines content according to condition of professional environment of IT-specialists.

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